RESEARCH ARTICLE

CAPACITY TO PRODUCE AN EFFECT OF HEAMODIALYSIS IN ACUTE AND CHRONIC RENAL PATIENTS

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Abstract

A kidney failure occurs when a kidney loses its functioning capacity. But when an unhealthy kidney is diagnosed, the subject or the patients are allowed to undergo the needed Haemodialysis as part of the treatment as well as procedure to keep the patient in good condition until a permanent solution is taken for the cure. Patients with Renal complications visiting the Nephrology Department of CMC Hospital and who were designated to u. Blood samples were collected from them in utmost sterile conditions using vacutainers, by the duty staffs, a day prior to the dialysis procedure in the Dept of Nephrology at the hospital. Without any interference or disruption of the normal exemplary routine of the Hospital, and the particular Nephrology unit, the samples were taken for biochemical analysis by the Clinical Biochemistry section. Undergo Renal Hemodialysis were identified and individuals selected at random. All the relevant blood parameters were analyzed, in the Autoanalyzer like HITACHI 912 available in the Clinical Biochemistry Department of the Hospital. The parameters observed under the study were, Sodium, Potassium, Urea Creatinine, Calcium, Phosphorus, Uric acid, Total protein, Albumin Bicarbonate, Total and Direct Bilirubin, SGOT, SGPT, and Alkaline Phosphatase.

Keywords: kidney failure, Haemodialysis, Renal Hemodialysis, blood parameters.

Introduction

The renal system is a group of organ in the body concerned with filter out excess fluid and other substances from the blood stream. The kidneys are the main organ of homeostatic because they maintain the acid base balance and water balance of the blood. The number of people affected by chronic kidney diseases and also renal replacement treatment is steadily increasing. At any two time in the UK, 400 -800 people per million of the population need renal replacement in the form of dialysis. The prevalence of dialysis in the UK is highly age dependent-for adults aged 70 – 80 years it's between 1600 and 2000 people per million.

Two main type of dialysis are available haemodialysis and peritoneal dialysis. The main factors that determine the dialysis with chronic kidney diseases have are patient preferences about which treatment fits best within their lifestyle,

availability of options within a service and clinical contraindications, factors patients and careers may need consider about peritoneal dialysis. The ability to carry out dialysis themselves.

The support service they need to carry out dialysis work, school, office, social and family activities opportunities to maintain social contacts possible modifications to their home. The distance and time travelling to hospital, flexibility of daily treatment, die and medication regiments and possible changes to body images and physical activities because of dialysis access points.

Diseases of the kidney

Pyelonephritis is an infection of the kidney with bacteria. Acute pyelonephritis is often accompanied by fever, chills, pain on the affected side, frequent

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passing of urine and burning on urination. Chronic pyelonephritis is a progressive, usually symptom-free disease that may eventually lead to destruction of the destruction of the kidney and to Uraemia.

Uraemia is the condition caused by accumulation in the blood of waste products normally excreted by the kidney. It occurs most often as the end stage of chronic kidney disease and is characterized by drowsiness, headache, nausea, inability to sleep, spasms, seizures, and coma.

Renal caluli, or kidney stones, may form in the kidney or renal pelvis from crystals deposited from the urine. They are composed mostly of calcium oxalate. Infection or obstruction may play a part in their formation. Stones may develop when the blood level of uric acid is too high, usually from over-consumption of meat. Excessive dietary intake of calcium and oxalate and low fluid intake have also been associated with formation of stones. In most cases, however, the cause is not known.

Nephrosclerosis, or hardening of the small arteries supplying the kidney, is a disorder characterized by the presence of albumin, casts and occasionally white or red blood cells in the urine (haematuria)**:**

The Nephrosis includes a variety of types of nephritis marked by degenerative changes in the tubules of the kidney. Nephrosis denotes a syndrome characterized by the presence of generalized edema, by large amounts of albumin in the urine, by excessive cholesterol in the blood, and by relatively normal urinary output.

Nephritis, The commonest form of nephritis is glomerulonephritis its chief characteristics are the appearance in the urine of such elements as albumin a condition known as albuminuria, red and white blood cells, and hyaline or granular casts, all revealed *by* microscopic examination of the urine. It is much more common in childhood and adolescence than in middle age.

EFFECTS OF DISEASE IN URINE

Analysis or urine is often used in diagnosis of disease Excessive urination is characteristic of diabetes insipidus and occurs to a lesser extent in diabetes mellitus. High or continuous fever produces some dehydration and an abnormally low output of urine. In patients suffering from hepatitis, the color of urine is dark because of bile pigments in the urinary system. The quantity of urea is increased in feverish conditions and diabetes mellitus and is decreased during inflammation of the kidney or disturbance of the body's acid-base balance. Abnormally large amounts of uric are present in the urine of leukaemia patients and gout sufferers. In a kidney disease known as albuminuria, serum albumin escapes into the urine. In diabetes mellitus, glucose appears in the urine.

Aim of study

In this new age of managed health care, generalists have had to assume increasing responsibility for managing problems previously tackled by specialists Although timely referral to and collaboration with a nephrologist is vital in caring for patients with renal disease, it is important for the primary care physician to be familiar with measures aimed at preventing the progression and complications of renal failure.

The number of patients with end-stage renal disease (ESRD) is rising rapidly. The cost of providing renal replacement therapy for these patients is increasing day by day. Early recognition of renal disease and appropriate interventions to delay its progression may decrease both human suffering and the financial costs associated with ESRD. Primary care physicians usually treat patients with diabetes and hypertension, the two leading caused of ESRD in the country. Since most patients with early renal failure are asymptomatic. Awareness and vigilance on the part of the primary care physician are essential for the early diagnosis, appropriate referral, and collaborative management of these patients.

The clinical management of the patient with progressive renal failure may be divided into several components:

1.   Early recognition of renal failure.
2.   Monitoring the progression of renal failure.
3.   Detection and correction of reversible causes of reversible causes of renal failure.
4.   Institution of interventions to delay progression of renal failure,
5.   Avoidance of additional renal injury.
6.   Treatment of complications (i.e. Acid-base, mineral, and fluid-electrolyte abnormalities) of renal failure**:** and
7.   Planning ahead for renal replacement therapy (dialysis or transplantation).

Materials and Methods

Sample collection

The cubital vein is selected for the blood collection. The tornique is applied just above elbow taking care not to be very light or uncomfortable. The patient is asked to fold the hand fist enabling the vein to rise up. When the vein is raised spirit is applied over the vein. The puncture in the vein is made with the needle attached to the adapter, once the needle has entered the vein the vacutainer is fixed into the adapter with slight pressure. Immediately release the tornique without disturbing the adapter. Once the blood fills the vacutainer (10ml) it is remover and capped, shake the vacutainer for the oreventing the formation of the clot.

Protection of Human rights

The samples were noted with special care to maintain secrecy of the identity of the patients undergoing renal-dialysis and from whom blood patients were noted while recording the results by the investigator. Since the data were collection form the monitoring computer in the Auto-analyzer, HITACHI 912 secrecy was assured.

HITACHI 912 Autoanalyzer

Simplified operation:

Automatic sample pre-dilution.
Automatic sample rerun with pre-diluted higher or lower sample volume
Automatic dilution of a single calibrator for non-linear calibration
Automatic barcode reading of test applications calibrator and control target values

User interface and control unit:

Touch screen Graphical User Interface
Data input via keyboard or Host computer
Up to 10.000 data files can be stored
Sorting and filter functions for selected data validation are user definable
Indirect potentiometric measurement of sodium
Just 18 seconds
Cooled, covered section with positions for 8 controls and 17
calibrators
Up to 360 photometric and turbidimetric test measurements per hour
Automatic carry-over evasion program

Sample disk loading.

Up to 50 samples in primary or secondary tubes can be placed into the sample tray continuous loading and unloading.

Specification:

System Discrete, fully-selective system for Clinical Chemistry ISE (Na^+ K^+ Cl^-) and Homogeneous Immunology

Test – 360 tests/hr, 760 tests/hr with ISE
Sample Types ⟶ serum, Plasma, Urine, CSF, Hemolysate

Sample Input/Output.

Load/unload capacity: 50 samples on the sample dist STAT samples are processed with priority, 20 positions on the sample disk.

Sample Container Types

Primary tubes: 5 to 10ml**: 16x100, 16x75, 13x100, 13x75mm
Sample cup: 2.5ml micro cup: 1.5ml. Cup on tube: 16x75/100mm tube
Reagents ISE**: Na^+ K^+ Cl^- Onboard capacity: up to 36tests
Control Unit: Windows NT PC wih Pentium II Processor. Touch screen Monitor.

The results obtained were recorded in the hospital computers and designated as pre-analysis results. A month after the renal dialysis, the blood samples were collected from the same patients observing the same standard and stiputed procedures and analyzed for all of the above mentioned biochemical parameters and referred as the post analysis results. These results were recorded in the computers too.

To study the effect of the hemodialysis on the biochemical parameters, the pre and post dialysis blood parameter results were tabulated compared and statistically evaluated for any significance.

This worker had the previlage of working in a Clinical Biochemical laboratory of an highly reputed Health Institution. During her tenure she had occasions to come cross examinations of samples related to Chronic Renal Failure and Acute Renal Failure patients. It was an humble wish to pursue a study on the efficacy of Dialysis given to the

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patients and analysis the changes in the biochemical dynamics.

It is a GOD send opportunity to study this as a curricular requirement.

Assay procedures

Estimation of total protein – (Bluret method)

1) Blank Reagent
A) Sodium Hydroxide
B) Water
C) Sodium Potassium Tartarate
2) Biuret Reagent
a) Sodium Hydroxide
b) Sodium Potassium Tartarate
c) Copper sulphate
d)
Normal Range: 6.0 – 8.5 gm/dl
Detection Range: 0.7 – 20.0 gm/dl.

Estimation of Albumin – (bromocresol green)

Reagents Required:

1) Bromocresol green
a) succinate buffer
b) Water
c) Brij-35
2) Standard (Boehringer Mannheim Pooled serum)
3)
Normal Range: 3.5 – 5.0 gm/dl
Detection Range: 1.0 – 5.5 gm/dl.

Estimation of SGOT – (UV, Kinetic)

Reagents Required:

1) Phosphate buffer, Ph 7.4/Subrsate/aspirate/MDH
A) Disodium hydrogen phosphate
B) Potassium dihydrogen phosphare.
C) Sodium azide
2) STAT Reagent (a-Oxaloglutar rate)
3)
Normal Range: 0-40U/L
Detection Range: 5-400U/L

Estimation of SGPT — (UV, Kinetic)

Reagent required

1) Phosphate Buffer, Ph 7.4/Substrate/alanine/LDH

A) Disodium hydrogen phosphate
B) Potassium Dihydrogen Phosphate
C) Sodium azide
2) STAT Reagent (Oxoglutarate)
.
Normal Range: 0-40U/L
Detection Range: 5-400U/L

Estimation of Alkaline Phosphatase (Kinetic)

Reagents Required

1) Buffered Substrate
a) Buffer
b) Diethanolamine
c) Magenisium chloride.
d) Distilled water.
e) P-Nitrophenyl Phosphate

Normal Range: 98-279U/L
Detection Range: 5-2000U/L

Estimation of Urea: (Enzymatic Urease)

Reagents Required
1. Urease
2. Phenol-sodium nitroprusside
3. Sodium hydroxide-Sodium hypochloride.
Normal Range: 0-40 mg/dl
Detection Range: 3.0-400 mg/dl

Estimation of Creatinine (Kinetic, Jaffe Method)

Reagents Required:
1) Sodium hydroxide
2) Picric acid
Normal Range: 0.4-1.5mg/dl
Detection Range: 0.2- 18.0mg/dl

Estimation of Total & Direct Bilirubin (Jendrassik and Grof)

Reagents Required:

1) Caffine sodium benzoate
a) Water
b) Sodium benzoate
c) Sodium acetate
d) EDTA – Potassium

2) Diazo reagent.
a) Sulohanilic acid
b) Sodium nitrate.
Direct Bilirubin
1) EDTA – Saline

a)   EDTA-Potassium
b)   Sodium chloride
2)   DiazoReagent
a)   Sulphanilic acid
b)   Sodium nitrate

Normal Range: Total Billirbin: 0.5 -1.0 mg/dl
                         Direct Billibin: 0.2 -0.5 mg/dl
Dection Range**:** Total Billirbin: 0.4 -30.0 mg/dl
                         Direct Billibin: 0.2 -30.5 mg/dl

Estimation   of   calcium   (Cresolpthalein complexone)

Reagent Required:

1)   AMPBuffer 1.5mmol/L, pH 10.7
a)   2Amino-2-Methyl-1-Propanol
b)   2-O-Cresolphthalein complexone
Normal Range: 9.0-10.5mg/dl
Detection Range: 4.5- 24.0mg/dl

Estimation of Phosphorus

Reagents Required:

Ammonium molybdate
a)   De-ionized water
b)   Conc. Sulphuric acid
c)   Ammonium molybdate
d)   Triton-x-100

Normal Range: 2.5-4.6mg/dl
Detection Range**:** 0.5- 24.0mg/dl

Results

Hemodialysis is one treatment for kidney failure. In which a machine called a Dialyzer, or filter, is used to clean the blood by filtering out wastes and extra fluids. It controls blood pressure and maintains body's homeostasis, or proper balance or elements such as potassium sodium, and chloride. Dialysis is commonly used to maintain life, although a kidney transplant is the ideal treatment for acute renal conditions.

The efficiency of hemodialysis can be assessed by the biochemical parameters of the pre and post dialysis blood of the patient with reference to the physiologicalnorm. A study was done to ascertain the efficacy of hemodialysis on the biochemical

parameters in renal patients attending the Nephrology department of C.M.C and H. Vellore.

The biochemical parameters included in the study were serum Sodium, Potassium, Bicarbonate, Urea, Uric acid, Albumin, total protein, creatinine. Total and Direct Bilirubin, diagnostic enzymes like SGOT, SGPT, Alkaline phosphatase and minerals like Calcium, Phosphorus. A total of sixteen parameters were taken under the study.

The pre and post Dialysis values obtained through the work was statistically analyzed for knowing the significance of hemodialysis using SPSS Package through one-way annova method.

The statistical analysis produced significance values for the biochemical parameters. The results were: Serum Alumin – 00.0000 alkaline phosphatases is 0.0160, Creatinine is 0.0098. Total and Direct Bilirubin is 0.0000. Sodium is 0.0244, Total Protein is 0.0302 and Uric acid is 0.0005. All these significant results confirmed the efficacy and the benefit of Hemodialysis as a replacement therapy for renal patients.
Serum calcium, potassium, Urea Phosphorus, SGOT and SGPT were found t be totally insignificant giving a negative inference for hemodialysis.

Comparing the significant value we can infer that Albumin, Uric acid, Creatinine are more relevant than Total protein, Sodium in expression of the significance.

Discussion

The study was taken up to find out the efficacy of hemodialysis on biochemical parameters in chronic, acute and End stage renal patients, who were attending the Nehphrology Department, of CMC Hospital, Vellore, during the past one year (2004-2005). Many Patients were advised to Undergo repeated hemodialysis for conditions ranging from Chronic Renal failure, acute Renal Failure to End stage Renal Disease. These patients were found to be attending the institution from various parts of india and were of different age groups.

In the course of the study and from the results obtained it was found that there were significant clinical indicates showing that hemodialysis in renal conditions have definitely benefited the renal patients. There were good number of reports and studies relevant to   this. The pre   and post

Table.1 analysis of Albumin

Variables	Mean	Standard deviation	P Value
Albumin Pre-dialysis result	3.431	0.762	0.0000
Albumin Post-dialysis result	3.353	0.752	

The statistical analysis infers that Albumin is Significant Normal Range: 3.5-5.0 gm/dl

Table.2 analysis of Alkaline Phosphate

Variables	Mean	Standard deviation	P Value
Alkaline Phosphate pre-dialysis Result	116.78	77.57	
Alkanline Phosphate Post-dialysis Result	105.22	69.69	0.0160

The statistical analysis infers that Alkaline Phosphate is Significant Normal range: 98-279 U/L

Table.3 analysis of Bicarbonate

Variables	Mean	Standard deviation	P Value
Bicarbonate Pre-dialysis result	17.35	6.44	0.42
Bicarbonate Pre-dialysis result	18.49	4.34	

The statistical analysis infers that Bicarbonate is Not Significant Normal stage: 22-26mmol/L

Table. 4 analysis of Calcuim

Variables	Mean	Standard deviation	P Value
Calcium Pre-dialysis result	8.518	0.260	0.0707
Calcium post-dialysis result	8.366	0.880	

The statistical analysis infer that Calcuim is not Significant Normal range**:** 9.0 -10.5 mg/dl.

Table .5 Analysis of Creatinine

Variables	Mean	Standard deviation	P Value
Creatinine pre-dialysis result	10.90	4.379	0.0098
Creatinine Post-dialysis result	7.888	3.844	

This statistical analysis infers that Creatinine is Significant Normal range**:** 0.4 -1.5 mg/dl

Table. 6 Analysis of Direct Billibrin

Variables	Mean	Standard deviation	P Value
Direct bilirubin Pre-dialysis results	0.181	0.124	0.0000
Direct billibrin Post-dialysis result	0.351	0.952	

This statistical analysis infers that Direct Billibrin is Significant Normal range**:** 0.2 -0.5 mg/dl

Table. 7 Analysis of Potassium

Variables	Mean	Standard deviation	P Value
Potassium Pre-dialysis results	5.155	1.095	0.1185
Potassium Post-dialysis result	4.874	0.965	

The statistical analysis infers that Potassium is Significant Normal range**:** 3.5-5.0 mmol/L

Table. 8 Analysis of Sodium

Variables	Mean	Standard deviation	P Value
Sodium Pre-dialysis results	132.11	20.16	0.0244
Sodium Post-dialysis result	137.00	4.696	

The statistical analysis infers that Sodium is Significant Normal range**:** 130-145 mmol/L

Table. 9 Analysis of SGOT

Variables	Mean	Standard deviation	P Value
SGOT Pre-dialysis results	29.370	29.54	0.9436
SGOT Post-dialysis result	32.037	46.48	

The statistical analysis infers that SGOT is Not Significant Normal range**:** 0-40 U/L

Table.10 Analysis of Phosphorus

Variables	Mean	Standard deviation	P Value
Phosphorus Pre-dialysis results	5.781	2.615	0.2666
Phosphorus Post-dialysis result	5.233	2.686	

The statistical analysis infers that Phosphorus is not Significant Normal range**:** 2.5 – 4.6 mg/dl

Table. 11 Analysis of SGPT

Variables	Mean	Standard deviation	P Value
SGPT Pre-dialysis results	35.740	55.13	0.9547
SGPT Post-dialysis result	37.518	51.40	

The statistical analysis infers that SGPT is Significant Normal range**:** 0-40 U/L

Table.12 Analysis of Total Bilibrin

Variables	Mean	Standard deviation	P Value
Total bilirubin Pre-dialysis results	0.4815	0.227	0.0000
Total bilirubin Post-dialysis result	0.7074	1.243	

The statistical analysis infers that Total Bilibrin is Significant Normal range**:** 0.5 – 1.0 mg/dl

Table. 13 Analysis of Total Protein

Variables	Mean	Standard deviation	P Value
Total Protein Pre-dialysis results	6.203	0.751	
Total Protein Post-dialysis result	6.407	0.877	0.0302

The statistical analysis infers that Total Protein is significant Normal range**:**
6.0 – 8.5 mg/dl

Table.14 Analysis of Uric Acid

Variables	Mean	Standard deviation	P Value
Uric Acid Pre-dialysis results	7.460	3.56	
Uric Acid Post-dialysis result	6.448	3.17	0.0005

The statistical analysis infers that Uric Acid is significant Normal range**:**
240– 410mmol/L

Table.15 Analysis of Phosphorus

Variables	Mean	Standard deviation	P Value
Urea Pre-dialysis results	151.18	63.466	
Urea Post-dialysis result	104.00	45.194	0.4013

The statistical analysis infers that Phosphorus is not Significant Normal range**:**
0-40 mg/dl.

Table.16 Significant biochemical parameters

S.No	Parameters	Significance
1	Albumin	0.0000
2	Alkaline Phosphatase	0.0160
3	Creatinine	0.0098
4	Direct Bilirubin	0.0000
5	Sodium	0.0244
6	Total Bilirubin	0.0000
7	Total Protein	0.0302
8	Uric Acid	0.0005

hemodialysis values of serum creatinine, urea, and uric acid were found to thave have changed for the betterment confirming the efficacy of the dialysis given to the patients. Pre and post dialysis results for serum protein, albumin, sodium and creatinine total protein, sodium, uric acid, total and direct bilirubin has a significant result for the efficacy. There was no perceptible change in calcium and Phosphorus level in the serum. Dr. Yong Ming Yang (2001) has observed that renal markers like calcium and phosphorus expressed no significant changes to dialysis, which is similar to the results obtained from this study.

Serum albumin, creatinine has a significant predictive value the potassium, phosphate and calcium with high serum creatinine concentration in high dialysis dosage. With low area pre-dialysis value was observed by shaprio et al., (1983) has a comparable outcome when related to the investigator's study.

Efficiency of hemodialysis of uric acid and creatinine in 23 patients with chronic renal failure investigated by the Daniewska-Michalska D, et al (1998) has delivered a significant identical result like this study.

In a study done on the acute renal failure patients in K.E.M Hospital, Bombay by Shan B.V. et al., (1985) reported that the diagnosis of ARF revealed an increased serum creatinine concentration with relation to the pre-renal analysis level of the patients. This was similar to the present work. Low urea concentrations and increase serum albumin efficiency on hemodialysis was noted by Menno p. kooistra [2003] showed identical outcome to the study.

Serum uric acid, total protein, has no significant predictive value while other variables like albumin, creatinine, have a significant predictive values as observed by [Vanholder and Ringoir, 1992]. This study revealed a constrasting outcome is serum uric and total protein values. The investigators Alvas J et al [1989] noted the value of the following parameters: sodium, potassium, chloride, urea, creatinine, calcium, phosphorus, before and after Hemodialysis. They reported absence of any significant difference in the values. A negative response for serum Sodium, Urea, Creatinine was noticed in this study.

For the efficiency of the Hemodialysis, the authors Kes P, and Ratkovic-Gusic I. [1994] assayed serum Urea by different diagnostic methods. They concluded that there was no significant change in the pre and post renal Urea levels. A concurrent result was the outcome of this work.

In an analysis done by Stack, A.G. and W.E. Bloembergen, A [2000] a low serum albumin level in pre and post hemodialysis were the outcome which was dissimilar to the values obtained in this study. Blake P.G., et al., [1993] recorded that Serum albumin in both pre and post dialysis values is correlated with extra cellular fluid volume in the patients. Age independently predicts lower serum albumin level in older dialysis patients.

Jung N, et al., [1998] concluded that sufficient elimination of retention products was possible and values could be achieved in the suburaemic region, after an investigation on the efficiency of dialysis on biochemical parameters like serum electrolytes and urea and creatinine. This study implies similar response for serum electrolytes, Urea, Creatinine. Paganini EP., et al., [1996] reported the following findings after a careful study of the pre and post dialysis patients. There was a significant increase in the albumin levels, significant decrease calcium and phosphorus levels. A concurrent result was outcome of this work.

Wang AY, Sea MM, Ip, R, et. [2001] reported the independent effects of residual renal function and dialysis adequacy on actual dietary protein, calorie and other nutrients intake in patients on continuous ambulatory peritoneal dialysis. This study implies that dietary intake of protein for renal patients might increase the serum albumin and the total protein levels. Chronic renal insufficiency related with acute renal failure is frequently associated with low values of serum proteins, summarized, Drumi W: [1998]. A contrasting outcome was observed in the study.

Normal function of the kidney is to regenerate bicarbonate. During Hemodialysis bicarbonate diffuses into the blood across the dialyzer membrane, aims of dialysis is to normalize the serum bicarbonate concentration. Optimal survival has been shown to relate to normal pre-dialysis serum bicarbonate concentration [lowrie ad lew. 1990]. The difference in pre and post dialysis bicarbonate concentrations in the patients shows a results in this study.

Jones C.H. et al., [2002] reported an increased serum albumin concentration in chronic hemodialysis patients. A contrasting outcome was observed in this study. The study results concur as findings by many investigators and researchers in this study. The above statistically significant results infer that hemodialysis is the choicest method of treatment for renal patients. It could be adapted as a curative one in the early stages of renal conditions as a temporary palliative measure is acute renal failure patients. Till such time other surgical or replacement therapy is considered.

Hemodialysis is one of the treatments for kidney failure. It is a mechanical process that partly performs the work of healthy kidneys, in which a machine called Dialyzer, or filters, is used to clean the blood by filtering out wastes and extra fluids. It controls blood pressure and maintains body's homeo stasis, or proper balance of elements such as potassium, sodium and chloride and eliminates extra fluid (edema) from the body. Dr. Yong Ming Yang, (2001) stated that, Hemodialysis is one of the best methods in the treatment of End-stage renal disease. The adequate dialysis was considered as the treatment method which eradicated the symptoms and signs of uremia and led to the full rehabilitation of treated patients.

Chronic glomerulonephritis and diabetic nephropathy are the commonest causes of end-

stage renal failure. This may result in hypoalbuminaemia at the start of dialysis, and a persistent significant urinary protein loss may continue into dialysis. (jones, C.H., et al., 1998). Since the functions of dialysis are diverse, measurement of dialysis adequacy is multi-dimensional. Monitoring includes clinical assessment and objective measurement, including weight, blood pressure, laboratory investigations and some measure of the amount of solute cleared during the dialysis process (Tattersal et. Al., 1998).

At the maximum ultra filtration rate of 90 ml/min, the total albumin loss ranged from 300mg/4 h to 7,000 mg/4h. Up to 50% reduction of albumin occurred within the first 30 minutes of the dialysis treatment. In a specific investigation. Ahrenholz PG. et al., (2004) demonstrated that not all dialysis membranes are comparable in their ability to specifically and efficiently remove middle molecules. Or curtail the unwanted excessive leakage of essential proteins from the patient's blood. Thus the selection of appropriate dialyzers for specific patient requirements should be based more upon clinical evaluations and analysis rather than on product specifications alone.

In a study on 51 pediatric cases of ARF seen at the K.E.M Hospital, Bombay during a 3 year period from 1981 to 1983, Shan B.V. et al., (1985) reported that the diagnosis of ARF was based on rapidly progressing azotemia (rise of serum creatinine by at least 0.5 mg/dl/day and blood urea nitrogen by 10 mg/dl/day0 usually, but not always, associated with oligouira. By providing supportive care for the kidneys through hemodialysis, preventing other complications such as infection or fluid or electrolyte imbalances the ARF may be corrected within a short period. A chemistry screen may be used to look for abnormalities in electrolytes. Such as sodium, potassium, bicarbonate and calcium. Tests may include blood urea nitrogen (BUN) serum creatinine, complete blood count (CBC), and a urinalysis, reported Alves J. et al (1989)

No significant changes were observed, including other markers of dialysis adequacy such as body weight, mean arterial pressure, correction of anaemia. Control of acidosis or control of the phosphorus-calcium equilibrium. (Dr. Yong Ming Yang. 1998). In a related investigation by, Barnard Canaud, Helene Leary-Moragues et al, (1998) forty-six treatments in 28 consecutive patients were analyzed. They reported that the Blood-based

kinetics used to estimate the does of dialysis in ARF patients on intermittent hemodialysis, provided internally consistent results. However, when compared with dialysate-side kinetics blood-based kinetics substantially overestimated the amount of solute (urea) removal.

The prescription of dialysis requires first, the knowledge of the normal fuction of the kidney of the patient, metabolism and physiology and of dialysis technology. Secondly, for achieving efficient dialysis, a blood flow of 200-300 ml/min through the shunt is regarded to be optimum and that must be ensured. Regular assessment of dialysis performance is strongly recommended to assure dialysis adequacy. Lengthening dialysis time may be a simple and efficient tool to compensate any shortfall in the adequacy (Abrecht and Prodany, 1971)

Early and frequent dialyses, lead to improved survival in patients of acute renal failure, reported Lindsay, R.M. and E. Spanner, (1989) and that the that outcome in cases of acute renal failure depends more on the underlying illness and secondary complications (infection, neurological and hematological complications) rather than on factors such as azotemia, acidosis or hyperkalemia.

Several studies were made with two major goals. First to understand and make quantitative analysis of the physiological processes of patients on hemodialysis second, the estimation of patient parameters, in order to deliver adequate doses of dialysis by controlling the removal of toxic solutes (Sargent and Gotch, 1975), and thereby reducing possible complications. Urea is usually assumed to be a marker solute for all toxins with low molecular weight (Gotch and Keen, 1991)

Conclusion

When healthy kidneys fail, serious complications arise, the body retains fluids and harmful wastes, which leads to rise in blood pressure, and rendering the body unable to perform its normal metabolic activities. Patients with early renal failure are invariably asymptomatic, so awareness and vigilance on the part of the primary care physicians are essential for the early diagnosis of Renal Diseases. Appropriate referral and collaborative management of these patients are required for proper maintenance of normal biochemical parameters which are indices of the prevailing renal

condition. Dialysis is the most vital therapy for Chronic, Acute, to End stage renal patients. It could be said that hemodialysis, definitely is a positive procedure as a substitute renal replacement therapy, to maintain the serum biochemical parameters almost within their normal range (to maintain them in a reasonable physiological norms)

On the analysis of the data collected for all the biochemical parameters (pre and post) of the twenty-seven patients who underwent dialysis in C.M.C & H. (Nephrology department) during the year 2013 it was found that there were significant results seen in eight parameters. The results confirmed the efficacy of hemodialysis as a renal replacement therapy. This study was taken up as a curriculum requirement and hence was limited to that extend. A more wider and intense study could reveal the efficacy of hemodialysis on biochemical parameters.

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